

We claim:

DL 847
1. A respiratory apparatus for delivering a flow of air to a patient suffering from sleep disordered breathing comprising:

a blower that generates a flow of pressurized air;
a patient interface adapted to deliver air from said blower to the patient;
a control unit coupled to said patient interface and adapted to sense a parameter characteristic of said flow of air, said control unit including an adjusting circuit adapted to operate on said parameter to generate a signal indicative of the breathing pattern of the patient; said control unit further including a first averager used to determine a first average of said signal, said adjusting circuit being adapted to restrict said signal within a predetermined range in response to said first average; and
a display adapted to show said signal.

2. The respiratory apparatus of claim 1 wherein said control unit includes a pressure sensor adapted to detect a pressure signal indicative of a pressure within said patient interface, said parameter comprising said pressure signal.

3. The respiratory apparatus of claim 1 wherein said control unit includes a baseline generator generating a baseline signal, said signal being related to said parameter and said baseline signal.

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4. The respiratory apparatus of claim 3 wherein said baseline generator is coupled to said first averager and is adapted to set said baseline signal to a value related to said first average.

5. The respiratory apparatus of claim 1 wherein said first averager is adapted to generate said first average over a first time period and wherein said control unit further

includes a second averager generating a second average of said signal over a second time period which is much shorter than said first time period, and wherein said adjusting circuit adjusts said signal in a first manner dependent on said first average in one set of conditions, and adjusts said signal in a second manner dependent on said second average in another set of conditions.

6. A respiratory apparatus used to provide air under controlled conditions to a patient with a pulmonary deficiency, said respiratory apparatus comprising:

a blower that generates a flow of pressurized air;

a patient interface that delivers said flow of air to the patient;

a control unit coupled to one of said blower and patient interface to derive a parameter indicative of said flow of air and the breathing of the patient, said control unit having a signal processing unit that processes said parameter to generate a respiration signal indicative of said breathing and an adjusting circuit adapted to determine an average value of said output signal and to adjust said respiration signal based on said average value to restrict said respiration signal to a predetermined range; and

a display adapted to show said respiration signal.

7. The respiratory apparatus of claim 6 wherein said adjusting circuit is adapted to determine a short term average value and a long term average value of said respiration signal based on a short and a long time period, respectively, said adjustment circuit being constructed and arranged to adjust said respiration signal in one of a first manner dependent on said short term average value and a second manner dependent on said long term average value.

8. The respiratory apparatus of claim 7 wherein said adjusting circuit is adapted to generate a baseline signal, said baseline signal being subtracted from said parameter to generate said respiration signal.

9. The respiratory apparatus of claim 8 wherein said adjusting circuit is adapted to set said baseline signal to a first value when an absolute difference between said baseline signal and said long term average value exceeds a first threshold.

10. The respiratory apparatus of claim 9 wherein said adjusting circuit is adapted to set said baseline signal to a second value when an absolute difference between said baseline signal and said short term value exceeds a second threshold.

11. The respiratory apparatus of claim 10 wherein said first threshold value is related to said predetermined range.

12. The respiratory apparatus of claim 10 wherein said second threshold value is related to a pressure sustained by a healthy person during a single continuous sustained inspiration or expiration.

13. The respiratory apparatus of claim 6 wherein said adjusting circuit is adapted to determine a short term average value of said respiration signal based on a short time period, said adjustment circuit being constructed and arranged to adjust said respiration signal when the difference between said short term average value and the predetermined threshold exceeds a predetermined threshold value for at least a predetermined duration.

14. In a respiratory apparatus adapted to provide a flow of pressurized air to a patient, a method for presenting a respiration signal indicative of the patient's breathing pattern, the method comprising:

determining a parameter within the device related to the flow of pressurized air and the breathing of the patient;

adjusting said parameter based on a baseline signal to generate a respiration signal within a predetermined range based on an average value of said respiration signal; and

displaying said respiration signal.

15. The method of claim 14 further comprising, taking a difference between said baseline signal and said parameter to derive an adjusted signal.

16. The method of claim 15 further comprising determining an absolute difference between said average value and said baseline signal and if said absolute difference is not less than a first threshold, then setting said baseline signal to said average value.

17. The method of claim 16 wherein said average value is calculated over a period longer than a typical breath of a person.

18. The method of claim 17 wherein said average value is calculated over a period of about 12 seconds.

19. The method of claim 16 wherein said first threshold is related to said predetermined range.

20. The method of claim 19 wherein said first threshold is a fraction of said predetermined range.

21. The method of claim 16 wherein said average value is taken over a period which is not longer than a typical breath of a person.

22. The method of claim 21 wherein said average value is taken over a period which is much shorter than a typical breath of a person.

Del A7 23. The method of claim 22 wherein said duration is about 0.5 sec.

24. The method of claim 23 wherein said first threshold is related to a minimum pressure maintained by a person during a single continuous inspiration or expiration.

25. The method of claim 14 wherein said parameter is the pressure at which air is provided to the patient.

Del A7 26. A method of keeping a respiratory signal from a patient within a predetermined dynamic range of an output/display unit comprising the steps of:
determining a parameter indicative of the patient's respiration; and
automatically adjusting said parameter based on a baseline signal to generate the respiration signal within said predetermined dynamic range.

27. The method of claim 26 further comprising automatically adjusting said parameter when said parameter is outside said predetermined range for a predetermined duration.

28. The method of claim 27 wherein said predetermined duration is long compared with the duration of a typical patient inspiration.

29. The method of claim 27 wherein said predetermined duration is long compared with the duration of a typical patient expiration

30. The method of claim 27 wherein said predetermined duration is approximately 6 seconds.

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